

REMARKS

Claims remaining in the present patent application are numbered 1-29. The rejections and comments of the Examiner set forth in the Office Action dated April 6, 2004 have been carefully considered by the Applicants. Applicants respectfully request the Examiner to consider and allow the remaining claims.

35 U.S.C. §102 Rejection

The present Office Action rejected Claims 1-5, 8, 13, 15, 16, 25, 26, 28, and 29 under 35 U.S.C. 102(b) as being anticipated by the Taniguchi reference (U.S. Patent No. 4,824,212). Applicants have reviewed the above cited reference and respectfully submit that the present invention as described in embodiments of independent Claims 1, 13, and 25, is neither anticipated nor rendered obvious by the Taniguchi reference.

Independent Claims 1, 13, and 25

Applicants respectfully point out that the present invention as described in embodiments of independent Claims 1, 13, and 25 includes, in part:

[A] display unit comprising:
 . . .
 a passive matrix . . .; and
 a fixed pixel border having a predetermined
width, said fixed pixel border surrounding said

passive matrix and comprising a plurality of pixels which are uniformly controlled between an on and off state by a common threshold signal.
(Emphasis Added)

Embodiments of the present invention as recited in independent Claims 1, 13, and 19 pertain to a controllable pixel border for a negative mode passive matrix display device. In particular, the present invention as described in embodiments of independent Claims 1, 13, and 19 recites that a fixed pixel border that surrounds the passive matrix is uniformly controlled by a common threshold signal.

Specifically, Figure 9 of the present Application describes the application of the common threshold signal to control the pixels in the fixed pixel border. The common threshold voltage is defined in the Specification of the present Application as the voltage difference between threshold voltage drivers 430a and 430b in their on or off states. In particular, the threshold voltage (V2) is applied to all the pixels of the fixed pixel border in the on state, and the threshold voltage (V1) is applied to all the pixels of the fixed pixel border in the off state. That is, when the threshold driver circuits 430a and 430b are enabled, the common threshold voltage (V2) is applied to the pixels of the fixed pixel border region, and for example become white. When the threshold driver circuits 430a and 430b are not enabled, the common threshold voltage (V1) is applied to the

pixels of the fixed pixel border region, and for example become dark.

Applicants respectfully note that the prior art reference, Taniguchi, does not comprise nor suggest the present display unit that comprises, in particular, the fixed pixel border that surrounds a passive matrix and that is uniformly controlled by a common threshold signal as recited in embodiments of independent Claims 1, 13, and 25 of the present invention.

In contrast to the present invention as recited in embodiments of independent Claims 1, 13, and 25 the Taniguchi reference discloses a liquid crystal display device that includes an effective display region and a non display region, wherein the non display region is not driven by a common threshold signal. Specifically, the Taniguchi reference controls the six parts of the non display region by applying voltage that is not a threshold signal to the transparent electrodes in the non display region when there is an output from one of the driving circuits connected to the vertical electrodes within the effective display region. Additionally, when no output is applied to the vertical electrodes within the effective display region, no voltage is applied to the non display region. In summary, when characters are displayed in the effective display region, voltage is applied to the non display region, and when

characters are not displayed, no voltage is applied to the non display region.

As such, the voltage applied in the non display region of the Taniguchi reference is not a common threshold signal, as claimed in independent Claims 1, 13, and 25 of the present invention. As described previously, the Specification of the present Application clearly defines the common threshold signal as the differences between threshold voltage drivers in their on and off states. The Taniguchi reference does apply a voltage to the electrodes in the non display region for control; however, the voltage in the Taniguchi reference is not a common threshold voltage, as claimed in independent Claims 1, 13, and 25 of the present invention. Instead, the Taniguchi reference describes a level alternating signal from a control circuit that is not a threshold voltage, as claimed in the present invention.

Moreover, in contrast to the presently claimed invention, the Taniguchi reference clearly states that no voltage is applied to the electrodes in the non display region when there are no outputs from the driving circuits supplying voltage to the vertical electrodes of the effective display region. That is, the Taniguchi reference does not apply any voltage in the off state. On the other hand, as claimed in independent Claims 1, 13, and 25 a common threshold voltage is applied even in the off state.

Specifically, in the off state, embodiments of the present invention still apply the common threshold voltage (V1) to the pixels in the fixed pixel border.

Furthermore, in contrast to the presently claimed invention, the Taniguchi reference does not disclose the uniformly controlled pixels in the fixed pixel border, as described in independent Claims 1, 13, and 25. That is, the common threshold signal is applied uniformly to the pixels in the fixed pixel border for uniform control, in the present invention. On the other hand, the Taniguchi reference describes a non display region that is separated into six parts B1-B6 of Figure 1. Each of the six parts B1-B6 are separately controlled. In fact, two separate Y-drivers are utilized to drive horizontal electrodes in the top and bottom horizontal bars of the non display regions. That is, separate control signals are applied to each of the six parts B1-B6 of the non-display region of the Taniguchi reference instead of the common threshold signal applied to the pixels of the fixed pixel border that uniformly control the pixels between an on and off state, as claimed in independent Claims 1, 13, and 25 of the present invention.

Additionally, the present invention provides for contrast enhancement within the fixed pixel border by adjusting the common threshold signal, which in direct contrast to the Taniguchi reference. Specifically,

independent Claim 13 and dependent Claims 2 and 20 of the present invention each describe a contrast adjustment circuit that is operable to adjust the common threshold signal to match the contrast of the fixed pixel border to that of the passive matrix.

In contrast, the Taniguchi reference only provides for two states for the non-display region. That is, when a driving signal is provided to the vertical transparent electrodes, the driving signal is also provided to the electrodes of the non-display region. Also, when no driving signal is provided to the vertical transparent electrodes, no signal is provided to the electrodes of the non-display region. As such, the Taniguchi reference discloses an on state and an off state for the non-display region, which teaches away from the enhanced contrast capabilities of the present invention that is capable of adjusting the common threshold signal in order to provide improved contrast of the fixed pixel border to that of the passive matrix, as claimed in independent Claim 13 and dependent Claims 2 and 20.

Moreover, the Taniguchi reference is unable to provide the contrast capabilities of the present invention. For instance, the Taniguchi reference discloses that when voltage is applied to the vertical electrodes to display characters, the non-display region becomes bright in a normally black type display, and when the display is of the normally white

type, the non-display region becomes dark. (See col. 5, lines 49-60). In this case, the non-display region is of the same type as the written characters which does not provide improved contrast. For instance, in a normally black display, the characters are presented in white and the non-display region is displayed in white. If the characters are adjacent to the non-display region, no contrast is provided since the non-display region is of the same color as the characters. This result is similar for a normally white display.

In contrast, embodiments of the present invention as claimed in independent Claim 13 and dependent Claims 2 and 20 are able to provide for contrast enhancement by varying the common threshold signal applied to the fixed pixel border. That is, by varying the voltage of the common threshold signal, the proper enhancement between image in the passive matrix and the fixed pixel border can be achieved. The Taniguchi reference is unable to provide this contrast enhancement, and in fact does not provide any contrast enhancement as disclosed in the present invention.

Thus, Applicants respectfully submit that the present invention as disclosed in embodiments of independent Claims 1, 13 and 25 is not anticipated by the Taniguchi reference, and is in a condition for allowance. In addition, Applicants respectfully submit that the present invention as disclosed

in embodiments of Claims 2-12 which depend from independent Claim 1; embodiments of Claims 14-18 which depend from independent Claim 13; and embodiments of Claims 26-29 which depend from independent Claim 25 are also in a condition for allowance as being dependent on allowable base claims.

35 U.S.C. §103 Rejection

The present Office Action rejected Claims 11, 12, 17, 18, 24, and 27 under 35 U.S.C. 103(a) as being unpatentable over Taniguchi. Also, Claims 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi in view of Yokota et al. (U.S. Patent No. 6,181,313). Further, Claims 6, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi in view of Morimoto (U.S. Patent No. 6,535,188). Applicants have reviewed the above cited references and respectfully submit that embodiments of the present invention as recited in Claims 6, 9-12, 17-24, and 27 are neither anticipated nor rendered obvious by the Taniguchi reference taken alone or in combination with the Yokota et al. or the Morimoto references.

Independent Claim 19

Applicants respectfully point out that the present invention as described in independent Claim 19 recites, in part:

A portable electronic device comprising:

* * *

a display unit coupled to said bus and comprising:

a passive matrix

* * *; and

a fixed pixel border having a predetermined width, said fixed pixel border surrounding said passive matrix and comprising a plurality of pixels which are uniformly controlled between an on and an off state by a common threshold signal.

Applicants respectfully submit that the present invention as disclosed in independent Claim 19 is neither anticipated nor rendered obvious by the Taniguchi reference taken alone or in combination with the Yokota et al. reference. For analogous arguments set forth above with respect to independent Claims 1, 13, and 25, independent Claim 19 recites, in part, a portable electronic device including a display unit that comprises a fixed pixel border that is uniformly controlled by a common threshold signal, which is in direct contrast to the cited references. In particular, neither the Taniguchi nor the Yokota et al. references disclose the use of a common threshold signal, or the uniform control of the pixels in the fixed pixel border through the common threshold signal as claimed in independent Claim 19.

Thus, Applicants respectfully submit that the present invention as disclosed in an embodiment of independent Claim 19 is not anticipated by the Taniguchi reference taken alone

or in combination with the Yokota et al. reference, and is in a condition for allowance. As such, embodiments of the present invention as described in Claims 20-24 are also in conditions for allowance being dependent on allowable base Claim 19.

Moreover, Applicants respectfully submit that the present invention as disclosed in embodiments of dependent Claims 6-12, 17, 18, and 27 is neither anticipated nor rendered obvious by the Taniguchi reference taken alone or in combination with the Yokota et al. and Morimoto references. Specifically, the present invention as described in embodiments of dependent Claims 6-12, 17, 18, and 27 for analogous arguments set forth above with respect to independent Claims 1, 13, and 25, each describe in part a display unit that comprises a fixed pixel border that is uniformly controlled by a common threshold signal, which is in direct contrast to the cited references. As such, the present invention as described in dependent Claims 6-12, 17, 18, and 27 are in a condition for allowance as being dependent on allowable base Claims 1, 13, and 25.

CONCLUSION

In light of the facts and arguments presented herein, Applicants respectfully request reconsideration of the rejected Claims.

Based on the arguments presented above, Applicants respectfully assert that Claims 1-29 overcome the rejections of record. Therefore, Applicants respectfully solicit allowance of these Claims.

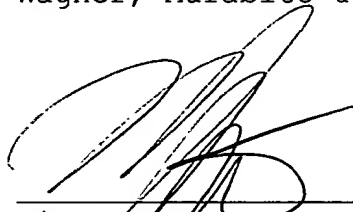
The Examiner is invited to contact Applicants' undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

Respectfully submitted,

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